# Hawaii Department of Transportation – Harbors Division
# DREDGE SPOIL STOCKPILE MANAGEMENT PLAN

Kalaeloa Barbers Point Harbor, Oahu, Hawaii

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**DREDGE SPOIL STOCKPILE MANAGEMENT PLAN**

## 1.0 SITE OVERVIEW

The Kalaeloa Barbers Point Harbor (KBPH) is situated on the Ewa Coastal Plain, which comprises the southwestern corner of the island of Oahu, Hawaii. The Ewa Plain is the largest coastal plain in the Pacific and was created during multiple stages of sea level fluctuation within the Late Pleistocene. The overall topography of the coastal plain is flat, and roughly steps upward in elevation inland where material deposited during past major high stands of the sea intersect. No streams cut across the coastal plain in the vicinity of KBPH which reflects both the flatness of the area and the high permeability of the emergent reef deposits which promote infiltration rather than overland flow. In parts of the coastal plain, enclosed depressions of up to 35 feet deep are found which have been interpreted as sinkholes resulting from secondary solution of the emergent reef by infiltrating rainfall.

## 2.0 STOCKPILE GENERAL DETAILS

There are five (5) stockpiles located at Kalaeloa Harbor which have been stored from accumulated material generated mainly during construction and expansion of Kalaeloa Harbor in Kapolei, Hawaii. The stockpiles have been designated as Stockpile 1 through Stockpile 5 as provided in Figure 1-1.

The cubic yards (CY) of the stockpiles are presented in Figure 1-1 and total approximately 2,000,000 C.Y. Stockpile 1 is owned by Kapolei Property Development (KPD) who operates under a C&C Honolulu stockpile permit

Stockpiles 2 through 4 were created in the late 1990s when the harbor basin was expanded. These stockpiles were engineered to ensure stability based on the materials and range in height up to 35 feet above the natural grade with slopes no steeper than 1.5 feet (run) to 1.0 feet (rise). Stockpile 2A is approximately 1,160,000 C.Y., Stockpile 2B is approximately 90,000 C.Y., Stockpile 2C is approximately 20,000 C.Y., Stockpile 3 is approximately 500,000 C.Y., and Stockpile 4 is approximately 70,000 C.Y.

Stockpile 5 is approximately 110,000 C.Y. The height of this stockpile is about 15-feet above natural grade at its highest. The near shear slopes that existed at this stockpile have been reduced with the removal of material.

Neighboring properties to the east and south (bordering Hanua Street) have also been utilized for stockpile material which has since been removed and reused. A majority of the stockpile material is crushed coral based on the site geology and previous soil studies on similar sources. Crushed coral is utilized in Hawaii as a non-expansive fill material for sites designated for

buildings and pavement providing it meets certain dimensions, plasticity, and percent composition of fine particles.

## 3.0 CURRENT STOCKPILE MANAGEMENT

### 3.1 Stockpile Stormwater BMP Design and Implementation

All five (5) stockpiles are on the DOT Harbors property. Stockpile 1, however, is under the control of the Kapolei Property Development, LLC (KPD). KPD has a Stockpiling Permit from the City and County of Honolulu (GP2013-09-0478) for operation and maintenance of this stockpile that expires on September 10, 2015. . At the time of this writing, only 30,000 C.Y. of material remains at the Stockpile 1 site which is otherwise ready for final grading and subsequent development for maritime support services and as a multi-purpose yard.

To complement the engineered slopes at Stockpiles 2 through 4, a design was developed which includes BMP components in Figure 1-2. The chemical stabilization was first applied in 2012 during the same mobilization allowing for a homogeneous layer of protective material. In addition to the chemical stabilization, detention barriers were constructed using filter fabric and concrete pile butts – which are the portions of reinforced concrete piles that are removed after the piles have been driven into the ground to their design depths to support structural foundations. Bio-socks to prevent stockpile material fines from entering harbor waters are placed immediately inside the concrete pile butt BMP to serve as additional containment.
Stockpile 5 is about 2,000-feet from the ocean and located on a newly acquired 54 acre parcel from KPD. The DOT Harbors implemented chemical stabilization BMPs in February of 2014.

As part of a strategy to manage stormwater runoff around the stockpiles, two retention basins are presently in use (See Figures 1-1 and 1-2). The retention basin behind Stockpile 3 was engineered to manage on and off-site runoff impacting the area. The retention basin behind Stockpile 2A was created by the placement of the stockpile and the existing topography of the area. Both basins collect and allow stormwater to percolate into the ground.

As prospective users acquire material from the stockpiles, they are required to maintain stormwater controls through engineered measures such as swales, berms, retention areas or other BMPs.

### 3.2 Stockpile BMPs

Several BMPs were selected for the site based on site conditions and the requirements to control both wind and water erosion. The KBPH location along the southwestern shore of Oahu is typically extremely dry and vegetation is difficult to establish without supplemental irrigation. Kapolei gets 10.13 inches of rain per year on average that is typically received over the span of 20-25 rain days per year (weather station KHIMAKAK1). However, unusually wet weather in 2013 and 2014 has resulted in vegetation establishing itself significantly over large portions of the stockpiles – thereby

supplementing the installed BMPs as effective stabilization and 'biofiltration' to further prevent stockpile runoff from entering the harbor. See attached photos in Attachment 1.

### 3.2.1 Chemical Stabilization

Chemical stabilizers, also known as soil binders or soil palliatives, provide temporary soil stabilization. The stabilizer is sprayed onto the surface of exposed soils to hold the soil in place and minimize erosion from runoff and wind. These materials are easily applied to the surface of the soil, can stabilize areas where vegetation cannot be established, and provide immediate protection. The manufacturer's specifications are followed for design of chemical stabilization application to the stockpile surfaces and slopes. Chemical stabilization was applied to Stockpiles 2 through 4 in 2012 and to Stockpile 5 in 2014. Chemical stabilization of the stockpile sidewalls substantially mitigates potential wind erosion. Information on the chemical stabilizer previously applied and recommended for future application, as necessary, is found in Attachment 2.

### 3.2.2 Sediment Barriers

Sediment barriers are perimeter sediment control structures constructed of concrete pile butts left over from harbor construction activities in combination with manufactured bio-socks placed at the seaward edge of each stockpile. The piles butts are typically eighteen-inch octagonal pre-stressed concrete poles laid horizontally and averaging about fifty-feet in length. Filter cloth is installed at structural gaps to improve barrier efficiency. Bio-socks are placed on the inside of the pile butts and at the toe of the stockpile slopes that do not face the sea. The sediment barriers provide for an efficient line of defense that completely surrounds the stockpiles. See Figure 1-2.

### 3.2.3 Vegetation Barriers

Although rainfall is limited, the Koa haole (*Leucaena leucocephala*), Kiawe (*Prosopis pallida**)*** and other non-native grasses have benefited from recent wet weather and established growth on the stockpiles and resulted in stability and cover over portions of the stockpiles, particularly on the slopes and at the base. These plants are expected to continue to thrive and increase the vegetative cover.

## 3.3 Current Removal

As evident with Stockpile 1, a relatively small amount of material remains to be removed after which final grading designed with engineered slopes and basins to promote retention, infiltration and evaporation will commence. The Department of Hawaiian Home Lands also removed portions of Stockpile 5 recently. Maintenance of the stormwater controls is required when interested parties remove portions of the stockpiled materials for their use. Upon the complete removal of the stockpiled materials, the area will be graded with the objective of minimizing runoff and maximizing infiltration until development occurs.

## 3.4 BMP Inspections and Maintenance

The stockpile BMPs are inspected annually to determine if maintenance is required. Inspections include checking the condition of areas previously treated with chemical stabilization to see if re-application is necessary (signs of run-off generated or wind-driven erosion), whether bio-socks are worn, monitoring of vegetation growth, and

determining if any new BMP devices are necessary. A maintenance project is then generated through the legislative process to address the findings of the inspection.

## 4.0 STOCKPILE DISPOSAL AND FINAL STABILIZATION PLAN

The current Harbors Division strategy for managing the Kalaeloa Barbers Point Harbor stockpiles focuses on disposal (i.e., removal) through sales and reuse of the dredge spoils materials while stabilizing the remaining stockpile through the use of temporary and permanent BMPs and associated practices. In view of the high level of residential, commercial & road construction activities along the south shore of Oahu over the foreseeable future, the marketing & sale of these stockpile materials is expected to take five (5) years or less. In conjunction with the disposal process, the stockpile stabilization plan consists of an integrated approach that combines the systematic removal of stockpiled materials, requiring disposal contractors to implement temporary BMPs during their removal & transport work, regular Harbors Division inspections and on-going maintenance of existing BMPs. The existing BMPs are shown in Figure 1- 2.

### 4.1 Annual Milestones

Current Harbors Division efforts are focused on verifying the amounts of materials in each stockpile to be sold; to analyze their geotechnical properties for determining potential reuse and value; and to conduct a market analysis to identify prospective users and buyers. The disposal process is currently anticipated to take 5 years with annual milestones of twenty percent (20%) of the stockpile materials by the end of each calendar year.

### 4.2 Sale and Removal

The stockpile material will be actively marketed to public agencies and private agencies in need of such materials for their projects in accordance with Hawaii Revised Statutes. Harbors Division has set the goal of removing twenty percent (20%) of the stockpile materials each year. At that rate, by the end of the next 5-year period, the existing stockpiles should be completely removed. If market interest for these dredge spoils materials is greater than expected, complete removal may occur sooner – thereby allowing for further functional development of the Kalaeloa Barbers Point Harbor in the current stockpile areas.

### 4.3 Grading

Upon the removal of each stockpile or portions thereof, the entities removing the material are required to grade the area with the objective of minimizing runoff and maximizing infiltration through use of engineered measures such as berms, swales, detention areas and BMP devices until development occurs. Future development of these areas will be in accordance with KBPH 2040 Master Plan (currently being finalized). The stormwater drainage will be in conformance with the modified Stormwater Management Plan for Honolulu and Kalaeloa Barbers Point Harbors – which is also being prepared for submission to EPA and HDOH in early February 2015.

## 5.0 FUTURE STOCKPILE REQUIREMENTS

It is anticipated that reuse and removal of dredged coral material and management of the same will be incorporated into the initial construction design, contracting scope, and budget of any future harbor expansion so that long-term on-site storage of stockpiled dredged spoils is not allowed.

Should it become necessary in the future to stockpile materials on a short-term basis, stockpiles will adhere to the current industry standard construction specifications calling for properly placed and stabilized spoil piles to reduce soil erosion. Stockpiles will be located as far away from drainage swales as possible. To prevent wind and water erosion, stockpile slopes will be engineered according to the characteristics of the materials stored. Stormwater BMPs will be implemented prior to construction activities so that pollution controls are in place prior to activities that have the potential to pollute.

# FIGURES

**KALAELOA BARBERS POINT HARBOR**
**STOCKPILE PLAN**

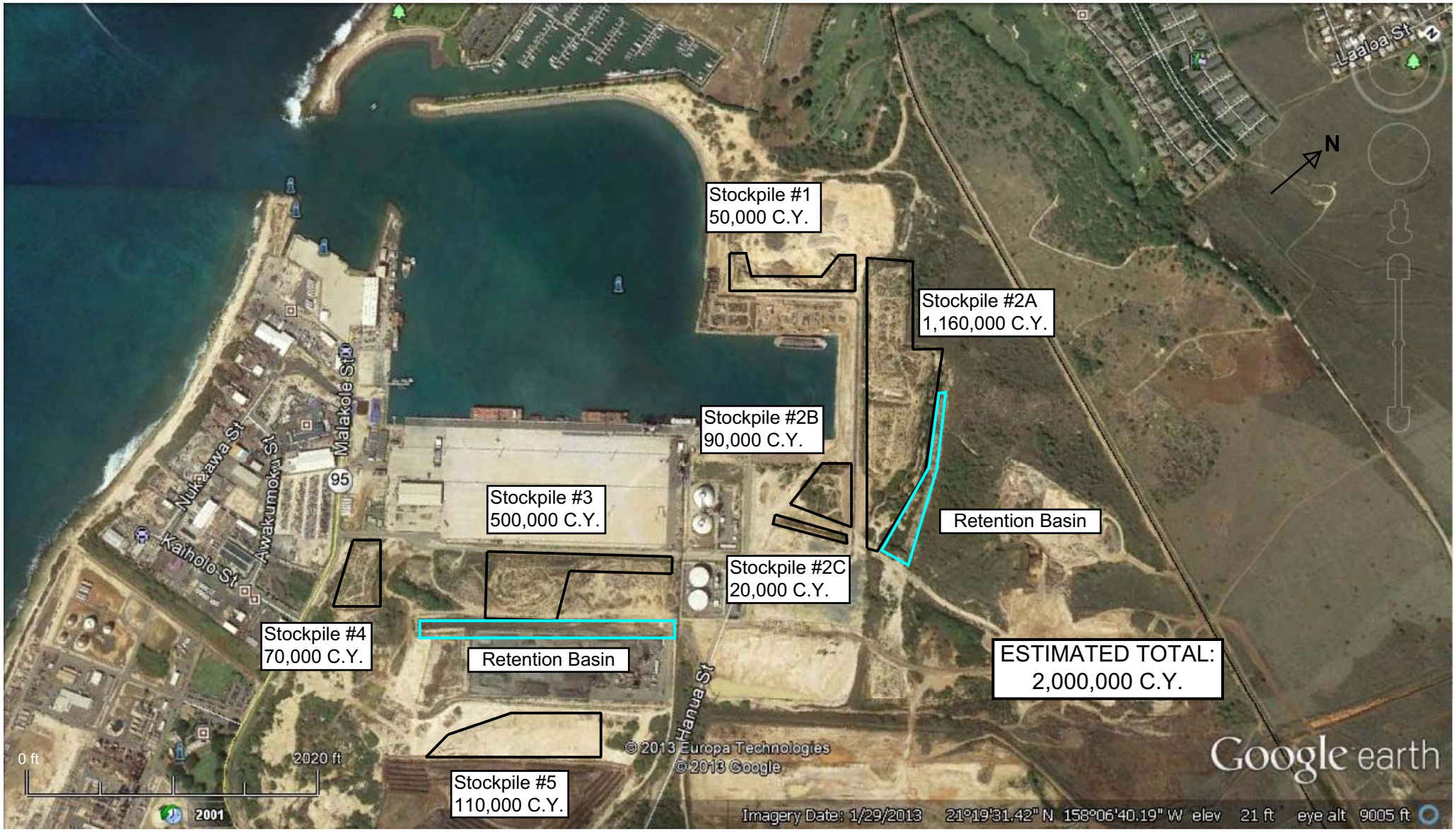
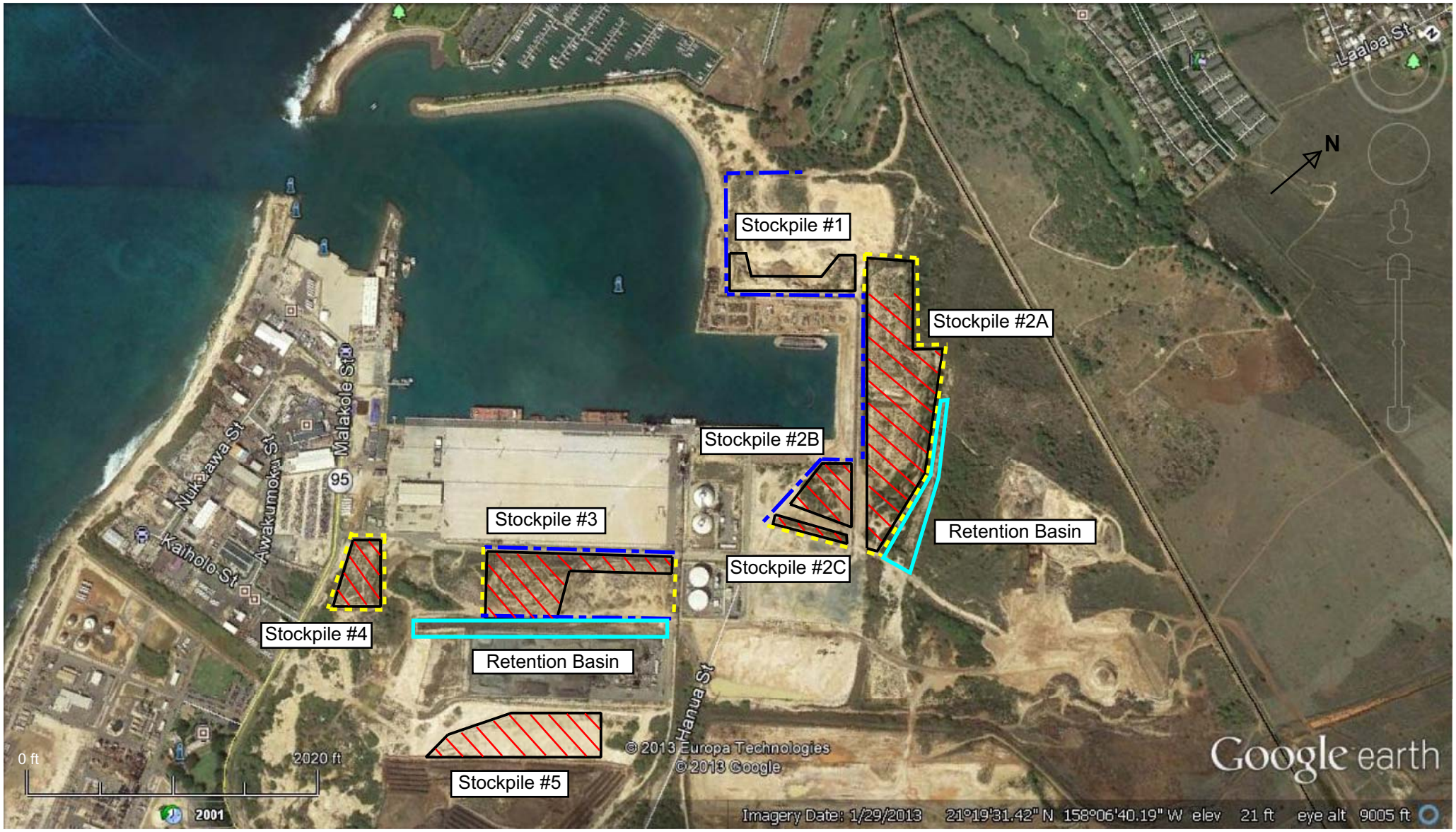



**FIGURE 1-1**

# KALAELOA BARBERS POINT HARBOR
# STOCKPILE PLAN




**LEGEND**

- **PILE W/ BIOSOCK**
- **BIOSOCK**
- **CHEMICAL TREATMENT**

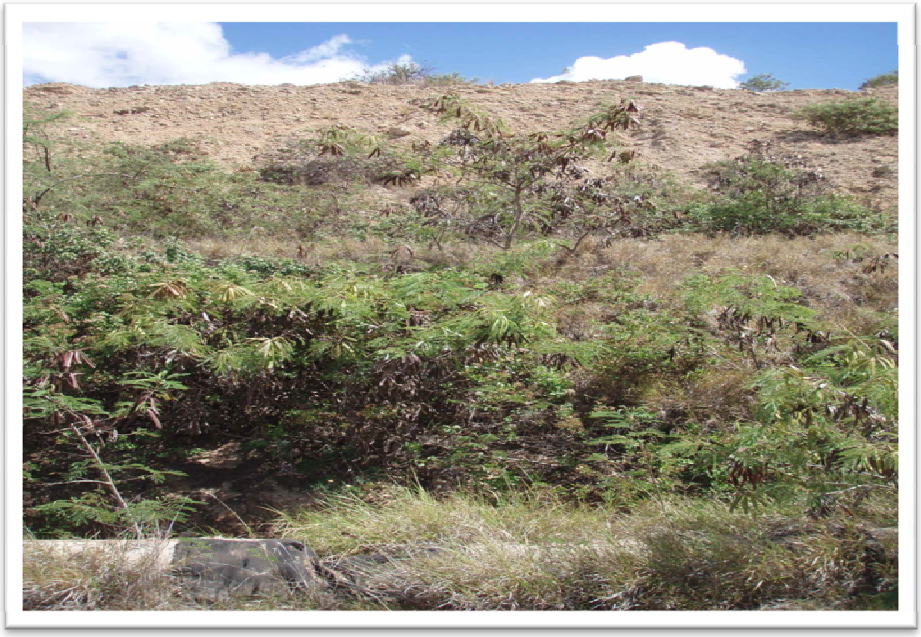
**FIGURE 1-2**

# ATTACHMENT 1

# KBPH Stockpile Photos

## Taken October 3, 2014

Stockpile 2A BMP - Well vegetated; looking westward.



Stockpile 2A BMP - Well vegetated; looking north, upslope.

Stockpile 2BC BMP - Well vegetated; along west slope.

Stockpile 2BC BMP - Well vegetated; along south slope.

Stockpile 3 BMP - Well vegetated; along southside slope.

Stockpile 3 BMP - Well vegetated; along northwest slope.

Stockpile 4 BMP - Well vegetated; along westside slope.

Stockpile 4 BMP - Well vegetated; along northside slope

Stockpile 5 BMP - Some vegetation above westside retention basin.

Stockpile 5 BMP - Some vegetated northward above retention basin.

# ATTACHMENT 2

# - Soil Sement Information Sheet

# Soil-Sement®

## Control Dust, Erosion, Unstable Soil

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When it comes to clothing, "one size fits all" is truly an ominous label because unless your body is in line with what the manufacturer considers the norm, that hat, tee shirt, or underwear is not going to fit you!

One reason Midwest's environmentally safe Soil-Sement polymer emulsion for controlling dust, erosion and unstable soil is used across dozens of industries and on many different soils is that it is not a one-size-fits-all product. It is custom-engineered to perform optimally on your soil taking into account a range of factors including dry strength, wet strength, ductility, elasticity, UV resistance, climate, and many others.

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- CARB (California Air Resources Board Documentation)
- Canada ETV
- US Army Corp of Engineers
- ADEMA (Arizona Department of Emergency and Military Affairs)
- San Diego State University
- Midwest Research Institute
- ERDC (Engineer Research and Development Center)
- Desert Research Institute

## Easy to be green

With chemists in our lab and experts on our customers' sites, Midwest has the home-grown ability to manufacture products that will not harm the environment and, in many instances, will help it. Our chemists think green from source materials all the way to application.

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